



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,922	12/07/2004	Michael Hesse	53620	7432
26474	7590	01/10/2007	EXAMINER	
NOVAK DRUCE DELUCA & QUIGG, LLP			GALE, KELLETTE	
1300 EYE STREET NW			ART UNIT	PAPER NUMBER
SUITE 1000 WEST TOWER			1621	
WASHINGTON, DC 20005				
SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE		DELIVERY MODE	
3 MONTHS	01/10/2007		PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/516,922	HESSE ET AL.	
	Examiner Kellette Gale	Art Unit 1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 12 December 2006.
- 2a) This action is FINAL.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 27-57 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 27-30, 32-39, 41, 45, 48 and 54-57 is/are rejected.
- 7) Claim(s) 31, 40, 42-44, 46, 47, and 49-53 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

The amendments to the claims has been acknowledged by the Examiner.

### ***Response to Arguments***

Applicant's arguments filed December 12, 2006 have been fully considered but they are not persuasive.

Applicant recites that because it is stated in the office action by the Examiner that the prior art of reference, Budge et al, does not teach the specific temperatures and pressures, the removal of succinic anhydride, or the use of the specific reactors said to be able to be used, that the art is not obvious over the claims.

The Examiner contends that although the specific temperatures and pressures are not used, they do overlap with the temperature and pressure ranges recited by Budge et al, therefore; it is indeed considered obvious over one another. Also, since the temperature and pressure ranges do overlap and the removal of succinic anhydride is said to be the result of a condensation reaction done at a temperature of 180°C and a pressure of 60 bar (example 2), it is acknowledged by the Examiner that Budge et al's reaction undergoes the same condensation reaction. If in fact this is not the same reaction as recited in Budge et al and condensation does not occur, applicant is requested to show the difference in the reactions and explain why this does not happen in Budge et al.

The catalyst recited in Budge et al meets the requirements as set forth in the claims as it is free of chromium, has less than or equal to 95% of copper and an oxidic support.

Also, please note that it is well known in the art to use such reactors as tube and bundle and fluidized bed type reactors in this type of reaction and it is also well known in the art to use a catalyst which is free from chromium and which has an oxidic support (please see additional art recited below).

Therefore, for the above reasons and for those recited in the prior office action, the rejection of claims 27-30, 32-39, 41, 45, 48, and 54-55 under 35 U.S.C. 103(a) as being unpatentable over Budge et al (US 5,196,602) is maintained.

Also, the rejection of claims 27-30, 32-39, 41, 45, 48, and 54-55 under 35 U.S.C 103(a) as being unpatentable over Budge et al (US 5,196,602) in view of Kuksal et al (Applied Catalysis A: General, 228 (2002) is maintained.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Budge et al (EP 0 404 408) and De Thomas et al (EP 0 318 129 and US 4,797,382).

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 56 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Budge et al (US 5,196,602).

Applicant claims the production of 1,4-butanediol wherein intermediate succinic anhydride is removed via a condensation reaction to a residual level of from less than about 0.3 to 0.2% by weight and wherein the catalyst comprises one or more further metals from groups 1 to 14 of the Periodic Table and that compound of the one or more further metals used as the catalyst is an oxide.

**Determination of the scope and content of the prior art**  
**(MPEP §2141.01)**

As stated above, condensation takes place at a temperature of 180°C and a pressure of 60 bar as applicant has stated in the last example of the specification. These parameters overlap with that of Budge et al, therefore; condensation and removal of succinic anhydride is seen by the Examiner to take place in Budge et al. Since the same temperatures and pressures are present, it is inherent that the same residual amount of succinic anhydride is present. Also, it is stated in Budge et al that any

hydrogenation catalyst can be used but representative of one is a mixed oxide catalyst comprising copper, zinc, and aluminum (col. 2, lines 50-60).

**Ascertainment of the difference between the prior art and the claims**

**(MPEP §2141.02)**

The difference between the claims and the prior art is that there is no actual statement of removing succinic anhydride.

**Finding of prima facie obviousness**

**Rational and Motivation (MPEP §2142-2143)**

As stated above and found in the previous office action, succinic anhydride is indeed removed because the same parameters of the reaction are present in the reaction. It would be obvious for one of ordinary skill in the art at the time of present invention to recognize condensation and removal of succinic anhydride takes place in the reaction as the parameters cause this to happen. One of ordinary skill in the art at the time of present invention would be motivated to optimize process conditions thereby removing the succinic anhydride for successful results in producing 1,4-butanediol as done by Budge et al.

***Allowable Subject Matter***

Claims 31, 40, 42-44, 46, 47 and 49-53 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

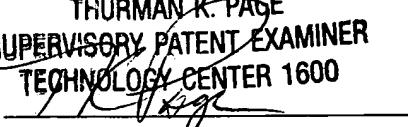
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kellette Gale whose telephone number is (571) 272-8038. The examiner can normally be reached on M-F (6:30am-3:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman Page can be reached on (571) 272-0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kellette Gale  
Patent Examiner  
Technology Center 1600

December 27, 2006

THURMAN K. PAGE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1600  


Thurman Page  
Supervisory Patent Examiner  
Technology Center 1600